Claims

1. A shrinkage disc unit, comprising:
   a) a rotational body (2;4) comprising a circumferential outer surface (24; 4d);
   b) a hub (1) surrounding the rotational body (2;4) and comprising a circumferential inner surface (25) which together with the circumferential outer surface (24; 4d) forms a joint (27) between the rotational body (2;4) and the hub (1) which is inclined with respect to a rotational axis (R) of the rotational body (2;4) in longitudinal sections of the shrinkage disc unit, wherein the hub (1) can be shrunk onto the rotational body (2;4) along the joint (27) or is shrunk on over the joint (27);
   c) a fluid channel (11,12,13;16) leading through the rotational body (2;4) or the hub (1), for charging the joint (27) with a pressurized fluid;
   d) and a fixing structure (2a,5,6;4b,5,6) which is formed by one of the rotational body (2;4) and the hub (1), alone or in combination with the other, and by means of which a tool (7,8;7,9) can be axially supported either on the rotational body (2;4) or the hub (1) and fixed in a predetermined rotational angular position on the rotational body (2;4) and/or the hub (1), for assembling and/or disassembling the hub.

2. The shrinkage disc unit according to the proceeding claim, characterized in that the joint (27) is circumferentially conical, at least in segments, preferably.

3. The shrinkage disc unit according to one of the proceeding claims, characterized in that a supporting collar (2f) is formed on either the rotational body (2;4) or the hub (1), in order to support the tool (7,8;7,9) in a positive lock.

4. The shrinkage disc unit according to one of the proceeding claims, characterized in that a positioning element formed as a cavity or protrusion on either the rotational body (2;4) or the hub (1), for a positioning element of the tool, formed as a protrusion (5) or cavity (6), in order to position the tool (7,8;7,9) at an exact rotational angle.

5. The shrinkage disc unit according to the proceeding claim, characterized in that the positioning element (6) is arranged near to a port of the fluid channel of the shrinkage disc unit, preferably arranged in a rotational angular position – relative to the rotational axis – which is 30° at most away from the port of the fluid channel.

6. A tool for assembling and/or disassembling the shrinkage disc unit according to one of the proceeding claims, said tool comprising:
   a) a fixing structure (7) for positioning the tool (7,8;7,9) on the rotational body (2;4) or the hub (1) at an exact rotational angle and axially supporting the tool (7,8;7,9) on one of the rotational body (2;4) and the hub (1);
   b) a pressure element or tensile element, supported by the fixing structure (7) (8;9) such that it can be moved, by means of which – when a fixing part (7) is axially supported on one of the rotational body (2;4) and the hub (1) – the other of the rotational body (2;4) and the hub (1) can be charged with an axial force;
   c1) and a fluid channel (10a,10b;35a) formed in the tool (7,8;7,9) and – when the tool (7,8;7,9) is fixed – connected to the fluid channel (10a,10b;35a) of the shrinkage disc unit, such that the joint (27) can be charged with the pressurized fluid through the fluid channel (10a,10b;35a) of the tool (7,8;7,9);
   c2) or a sealing mechanism (19) formed by the tool (7,8;7,9), for sealing off the fluid channel (16) of the shrinkage disc unit.

7. A combination of the shrinkage disc unit according to claim 1 and the tool – axially supported on the shrinkage disc unit and positioned at an exact rotational angle – according to claim 6.

8. A shrinkage disc unit including a separate tool, comprising:
   a) a conical circumferential outer surface (24) formed by a rotational body (2;4), preferably a tensioning sleeve (2) with preferably a cylindrical inner surface (14) or a shaft (4);
   b) a hub (1) having a conical circumferential inner surface (25) which is pushed onto the circumferential outer surface (24);
   c) a tool for assembling and/or disassembling the shrinkage disc unit which is not a part of the shrinkage disc unit;

characterized in that:

d) the tool is only connected to one of the rotational body (2;4) and the hub (1) in a non-positive and/or positive lock for assembling and/or disassembling the shrinkage disc unit;
e) the joint (27) between the conical circumferential outer surface (24) and the conical circumferential inner surface (25) is charged with a pressurized fluid for assembling and disassembling the shrinkage disc unit, wherein this can only be achieved when the tool is properly fastened to said one of the rotational body (2;4) and the hub (1).

9. The shrinkage disc unit according to one of the proceeding claims, characterized in that the tool comprises one or more protruding or retracted portions which engage with a corresponding number of portions of one of the rotational body (2;4) and the hub (1), substantially congruent with respect to the portion or portions of the tool, when fastening the tool, wherein the configuration and arrangement of the portions only allows the tool to be fastened such that the tool and the shrinkage disc unit are guaranteed to function properly.

10. The shrinkage disc unit according to one of the proceeding claims, characterized in that the tool is forced to be properly fastened to one of the rotational body (2;4) and the hub (1) by the configuration of the tool and said one of the rotational body (2;4) and the hub (1).

11. The shrinkage disc unit according to one of the proceeding claims, characterized in that the tool can be or is connected to one of the rotational body (2;4) and the hub (1) in a non-positive lock via a number of tensile screws (8).

12. The shrinkage disc unit according to one of the proceeding claims, characterized in that the tool is connected to one of the rotational body (2;4) and the hub (1) in a positive lock via at least one groove (2a;4b) at least partially encircling an outer surface of said one of the rotational body (2;4) and the hub (1) and at least one portion of the tool engaging the at least one groove (2a) in a positive lock.

13. The shrinkage disc unit according to one of the proceeding claims, characterized in that the tool is connected to said one of the rotational body (2;4) and the hub (1) in a frictional lock by surface contact.

14. The shrinkage disc unit according to one of the proceeding claims, characterized in that:
    a) the joint (27) is charged with pressurized fluid via a supply conduit (11,12,13;16) which is integrated into one of the rotational body (2;4) and the hub (1) and via a supply conduit (10a,10b) which is integrated into the tool.;
    b) and wherein there is a connection between the supply conduits when the tool is properly fastened to said one of the rotational body (2;4) and the hub (1).

15. The shrinkage disc unit according to the proceeding claim, characterized in that:
    a) the joint (27) is charged with pressurized fluid via a supply conduit (11,12,13) which is integrated into the shaft (4), via a supply conduit (31,32) which is integrated into the tensioning sleeve (2) and connected to the supply conduit (11,12,13) of the shaft (4), and via a supply conduit (10A,10B) which is integrated into the tool;
    b) and wherein there is a connection between the supply conduits when the tool is properly fastened to the shaft (4).

16. The shrinkage disc unit according to one of the proceeding claims, characterized in that the joint (27) is charged with pressurized fluid via a supply conduit (11,12,13) which is integrated in said one of the rotational body (2;4) and the hub (1) and via a supply conduit (35a) formed by a component of the tool, wherein the component is connected indirectly or directly to a fixing structure (7) of the tool and the supply conduit (35a) inserted in the component is preferably arranged substantially radially with respect to the rotational axis.

17. The shrinkage disc unit according to the proceeding claim, characterized in that the supply conduit (35a) formed in the tool is formed by the longitudinal bore of a screw-in lance (35) preferably via an outer thread (35d) into an inner thread (7e) of an installation bore (7g) of the fixing structure and the longitudinal extension of the installation bore is preferably substantially radial with respect to the rotational axis.

18. The shrinkage disc unit according to the proceeding claim, characterized in that the end of the screw-in lance (35) facing the rotational axis comprises a conical trunnion (35c) which, once the tool has been attached to one of the rotational body (2;4) and the hub (1), comes to rest on the congruent wall (36a) of a bore

(36) when the screw-in lance (35) is screwed into the installation bore (7g), preferably the bore (36) is a conical bore.

19. The shrinkage disc unit according to the proceeding claim, characterized in that the bore (36) of said one of the rotational body (2;4) and the hub (1) is inserted substantially flush with the radial bore (11), wherein there is a connection to the bore (11).

20. The shrinkage disc unit according to one of the two proceeding claims, characterized in that the conical trunnion (35c) coming to rest on the wall (36a) seals off the screw-in lance (35) from said one of the rotational body (2;4) and the hub (1), preventing pressurized fluid from escaping into the surroundings of the shrinkage disc unit.

21. The shrinkage disc unit according to one of the proceeding claims, characterized in that a pressurized fluid supply conduit formed in the tool is formed by the conduit channel (40a) of a tube (40).

22. The shrinkage disc unit according to the proceeding claim, characterized in that one end of the tube (40) is connected, permanently and pressure-sealed, to a preferably substantially spherical element (39).

23. The shrinkage disc unit according to the proceeding claim, characterized in that the other end of the tube (40) can be or is connected indirectly or directly to a pressure port.

24. The shrinkage disc unit according to one of the three proceeding claims, characterized in that the spherical element (39) surrounds the end of the tube (40), wherein the opening of the conduit channel (40a) is not blocked.

25. The shrinkage disc unit according to one of the four proceeding claims, characterized in that the tube (40) can be or is connected indirectly or directly to the fixing structure (7) of the tool, wherein the longitudinal extension of the tube preferably runs along the centre axis of an installation bore (7g) which is preferably arranged substantially radially with respect to the centre axis of said

one of the rotational body (2;4) and the hub (1), preferably the rotational body (2;4).

26. The shrinkage disc unit according to one of the five proceeding claims, characterized in that once the tool has been attached to said one of the rotational body (2;4) and the hub (1), the spherical element (39) comes to rest on the wall (36a) of a preferably conical bore (36), when a pressure piece (43) provided with an outer thread (43c) is screwed into the inner thread (7e) of the installation bore (7g).

27. The shrinkage disc unit according to one of the six proceeding claims, characterized in that the preferably conical bore (36) is inserted, substantially flush with the radial bore (11), into said one of the rotational body (2;4) and the hub (1), preferably the rotational body, wherein there is a connection to the bore (11).

28. The shrinkage disc unit according to one of the seven proceeding claims, characterized in that the spherical element (39) coming to rest on the wall (36a) seals off the tube (40) from said one of the rotational body (2;4) and the hub (1), preventing pressurized fluid from escaping into the surroundings of the shrinkage disc unit.

29. The shrinkage disc unit according to one of the eight proceeding claims, characterized in that the pressure piece (43) is connected indirectly or directly to the spherical element (39).

30. The shrinkage disc unit according to one of the nine proceeding claims, characterized in that the pressure piece (43) is connected to the spherical element (39) via an axial spring element and via a pressure sleeve (41).

31. The shrinkage disc unit according to the proceeding claim, characterized in that the tube (40) is guided through a bore of the pressure sleeve (41).

32. The shrinkage disc unit according to one of the proceeding claims, characterized in that when the shrinkage disc unit is assembled, the hub (1) is secured against axially shifting along the centre axis of the rotational body (2;4) in a positive lock

on the rotational body (2;4) via a number of securing elements (29), wherein the securing elements (29) are secured in their position on one of the rotational body (2;4) and the hub (1) in a non-positive lock or/and a positive lock.

33. The shrinkage disc unit one of the proceeding claims, characterized in that the tensioning sleeve (2) is prevented from axially shifting along the centre axis of the shaft (4) by the configuration of the tensioning sleeve (2) and the shaft (4).

34. The tool according to claim 5, characterized in that the fixing structure (7) is an annular body and bears a number of sub-assemblies (8;9) which apply the axial forces for assembling the shrinkage disc unit, and wherein the fixing structure (7) is embodied in one or more parts and wherein at least one division is embodied radially with respect to the longitudinal axis of the fixing structure.

35. The tool according to the proceeding claim, characterized in that the sub-assemblies for applying the axial forces are embodied as fluid-operated duty cylinders or as screw elements or as wedge mechanisms or as lever mechanisms or as combinations of these, and wherein these sub-assemblies are connected indirectly or directly to the fixing structure (7).

36. The tool according to the proceeding claim, characterized in that the sub-assemblies for applying the axial forces are embodied as hydraulic cylinders which consist substantially of cylindrical bores (26) comprising a pressure port (26a) and of pistons (9), wherein the cylindrical bores (26) are preferably worked directly into the fixing structure (7).

37. The shrinkage disc unit according to one of the proceeding claims, characterized in that the circumferential outer surface (24;4a) and the circumferential inner surface (25) comprise a number of congruent portions.